THE
AMERICAN JOURNAL
OF THE MEDICAL SCIENCES

SEPTEMBER, 1899.

OPERATIONS IN GASTRIC ULCER.[1]

BY LEONARD A. BIDWELL, F.R.C.S., ENG.,
SENIOR ASSISTANT SURGEON AND DEAN OF THE POST-GRADUATE COLLEGE, WEST LONDON HOSPITAL, LONDON.

THE surgical treatment of gastric ulcer is a comparatively new branch of surgery, the first operation having been performed as recently as 1881; but since that time several hundred operations for perforation of a gastric ulcer have been recorded in various parts of the world. In more recent years operations have also been proposed and successfully carried out in non-perforating cases, on account of severe hemorrhage, or because they had resisted ordinary medical treatment.

There can be no doubt of the importance of this subject to both physicians and surgeons when so great an authority as Ewald has estimated that gastric ulcer affects 5 per cent. of the population. Now, though 75 per cent. are cured by medical means, perforation occurs in from 1.2 per cent. to 12 per cent. of all cases, according to various estimates, and hemorrhage occurs in 45 per cent. of all cases, and, according to Von Leube, is responsible for death in 8 per cent. of the cases in which it occurs. In cases which escape these two complications it is not uncommon to find dilatation of the stomach from pyloric stenosis. We must therefore regard gastric ulcer as a very serious disease.

It is not within the scope of this paper to discuss the causation of symptoms of ulcer of the stomach, but rather to point out the various operations which have been done, the indications for their performance, and the chances of a successful issue.

An operation may be required in several different complications of gastric ulcer. It is absolutely and imperatively demanded in all cases of perforation of the ulcer into the general peritoneal cavity. It is also demanded in cases in which profuse hemorrhage has taken place, and has been repeated within a short interval, and in cases of oft-repeated slight hemorrhages. Finally, it is recommended in those cases which resist ordinary medical treatment, especially in those where there is dilatation of the stomach from pyloric stenosis dependent either upon cicatricial contraction within or on adhesions outside the stomach.

---

[1] A paper read before the West London District Branch of the British Medical Association.

Although there may be a considerable difference of opinion about the propriety of operating in all the above conditions, all will agree with the urgent necessity for surgical interference in cases of acute perforation. I shall therefore consider this condition first. The perforation commonly occurs on the anterior surface, but may occur on the posterior, or on both surfaces. In other cases it is found at the lesser curvature and at the pylorus. The site of the ulcer is mentioned in 47 of my series of cases, and is stated to have been on the anterior wall in 36 cases, on the posterior wall in 8, at the lesser curvature in 2, and on both surfaces in 1 case. In the collection of cases of another surgeon, M. Comte, the site of the ulcer is mentioned in 43 cases, and is stated to be on the anterior wall in 28, on the posterior wall in 8, at the lesser curvature in 4, and at the pylorus in 3 cases. This gives a total of 90 cases in which the site of perforation is mentioned, with 64 on the anterior and 16 on the posterior wall, 1 with both walls affected, 6 at the lesser curvature, and 3 at the pylorus.

The symptoms of acute perforation are usually these: A patient, generally a young woman, with a history of dyspepsia and sometimes of hæmatemesis, has an attack of very acute abdominal pain referred to the epigastric, umbilical, and right hypochondriac regions. This usually occurs shortly after a heavy meal, and is accompanied by very severe shock and severe retching. Vomiting is not a constant symptom, but when present the vomit is not of large quantity and is often blood stained. The pulse is rapid and feeble, and the temperature often subnormal. The abdomen is often retracted at first, there is absence of movement on respiration, and there is great tenderness, which is often specially marked at one spot. There is a peculiar board-like rigidity of the abdominal walls, but the legs are not usually drawn up as in peritonitis due to disease of the viscera in the lower half of the abdomen. Later on it is very common to get a diminution or even obliteration of the area of liver dulness, but this, though a sign of great importance, as indicating the presence of free gas in the peritoneal cavity, is not, however, constant; it has not been noticed in a number of cases, and would scarcely ever occur in perforation of the posterior wall of the stomach. After a few hours there will often be found signs of fluid in the peritoneal cavity, as evidenced by impaired resonance in the flanks, possible fluctuation and thrill, and shifting dulness. Still later, the abdomen will become much distended and tympanitic, with a protruding umbilicus, and the signs of free fluid will be more marked; diarrhœa usually supervenes, the tongue becomes dry and cracked, the pulse wiry and running, and the temperature high. The patient will gradually sink, and dies within a few days. Occasionally the shock is so severe that the patient succumbs within a few minutes of perforation. Thus in a case recorded by Fenwick, a man died suddenly shortly after a heavy meal; at the autopsy it was found that a gastric ulcer had perforated into the pericardium.

Briefly, then, the symptoms and signs which should guide us in making a diagnosis of perforation are (1) history of previous treatment for gastric ulcer and of the occurrence of hæmatemesis, (2) the sudden onset of the pain, (3) the intense shock, (4) the board-like rigidity of the abdominal walls and the presence of a tender spot over the stomach, (5) the diminution or absence of liver dulness, and (6) the presence of free fluid in the peritoneal cavity.

In the following case, which will serve as an illustration, these symptoms and signs were well marked. A woman, aged twenty-nine years, had been treated for seven months, both in the out-patient department and by her own doctor, for gastric ulcer, and had suffered from several attacks of hæmatemesis. Under suitable diet, etc., she was improving, but on April 23d she felt very hungry, and so ate a large mutton chop; three hours after this she was seized with a sudden pain of great intensity, which doubled her up; there was slight vomiting and considerable nausea. She was seen by her doctor at once and given opium. On the next morning, as the pain still continued and the abdomen had become distended, she was sent up to the West London Hospital, where she was admitted under my care. On admission she looked very ill; her temperature was 99°; her pulse was 100 and weak. The tongue was fairly clean. The abdomen was greatly distended, especially in the epigastric and umbilical regions and in the flanks, and did not move on respiration. There was a board-like rigidity and tenderness on palpation, epecially at a spot just below the costal arch; there was a tympanitic note all over except in the flanks, where the resonance was impaired; there was an indistinct sense of thrill across the abdomen. The area of the liver and of the splenic dulness was diminshed.

In cases of perforation of the posterior surface of the stomach the symptoms will be less marked; there will, however, be as much shock and abdominal pain; but as the lesser peritoneal cavity usually becomes shut off from the general peritoneal cavity by adhesions, there will in such cases be no alteration of the liver dulness, and probably no signs of free fluid in the abdomen. If left to nature a local collection of pus will probably form, constituting one variety of subphrenic abscess, which we will discuss later.

There can be absolutely no question about the importance of an early diagnosis in cases of perforated ulcer, since the prognosis after operation is directly dependent upon the length of time which has elapsed between the occurrence of perforation and the operation. Thus in a table of 55 cases which I have collected, 33 cases recovered after operation; of these 33 we find the length of time elapsing between perforation and the operation is stated in 25 cases; of these the operation was performed within six hours of perforation in 8 cases, or one-third of the total number of recoveries; in 5 more cases it was done between six and twelve hours, and in 7 cases between twelve and twenty-four hours; in only 5 cases, one-fifth of the whole, was the operation performed at an interval longer than twenty-four hours. If we turn to the 23 fatal cases the time is stated in 17; of these none were operated on within twelve hours, 7 of the cases were operated on within twenty-four hours, 6 within forty-eight hours, and 4 at an interval exceeding forty-eight hours. Thus we find that all the cases operated on within twelve hours of perforation—namely, 13—were successful; of the 14 cases operated on between twelve and twenty-four hours one-half were cured, and of the 15 cases operated on at a longer interval than twenty-four hours only 5, or one-third, were cured. In corroboration of these statistics I would refer to Comte's series of 65 operations for perforation, with 19 recoveries; of these 19 recoveries 11 were operated on within the first ten hours, and two others at an interval of thirteen and sixteen hours respectively, while of the 46 deaths only 6 occurred in cases operated on within the first ten hours. I do not think that more striking evidence of the importance of early operation could be imagined.

Having, I think, proved to you that no delay should be allowed to occur before operating, I will briefly describe the necessary procedure. As a great amount of shock is always present in these cases, we must take special precautions to minimize the shock caused by the operation itself. The patient must be kept warm; if in hospital, a hot-water table should be used; but if this is not available, the patient should be packed round with hot-water bottles, and the limbs should be encased in warmed cotton-wool and flannel bandages. A brandy enema is often required before the operation, and occasionally the intravenous injection of a couple of pints of normal saline solution. No very energetic means can be employed to render the skin of the abdomen aseptic, on account of the great tenderness, but it may be gently washed with soap and water, a compress soaked in a 1 in 20 carbolic acid solution applied; when the patient is under the anæsthetic the skin should be thoroughly scrubbed with a nail brush, then with turpentine, and finally with 1 in 20 carbolic acid solution again. An incision three inches long is made either in the left linea semilunaris, or in the middle above the umbilicus. I rather prefer the former position. On opening the peritoneum there will usually be a large escape of gas, of stomach contents, and of purulent fluid if the ulcer has perforated on the anterior surface of the stomach. A search is then made for the perforation, which may be found about the centre of the anterior surface of the stomach, or near the pyloric end or lesser curvature. In either of these last-named positions it will be more or less concealed by the liver, but some lymph and recent adhesions in this position will usually indicate the site of the lesion. In cases in which there is extravasation of the stomach contents the adhesions should be separated, exposing the ulcer, which will then be seen or felt by the finger. After sponging away any extravasated contents the stomach-wall in the neighborhood of the ulcer should be brought forward as far as possible by grasping the edges of the ulcer with catch forceps. No attempt should be made to excise the ulcer, but it should be invaginated, and the adjacent part of the stomach-wall brought together over it by one or two rows of Halsted's or Lembert's sutures. The sutures must be passed a considerable distance from the ulcer, otherwise they will cut out on account of the friability of the stomach-wall close to the ulcer. The peritoneal cavity should then be thoroughly flushed out with normal saline solution (one teaspoonful of common salt to a pint of boiled water), and if the gastric contents have reached the lower part of the abdomen it will be necessary to make a counter opening above the pubes and irrigate Douglas's pouch in addition. Special care must be taken to irrigate thoroughly the upper surface of the liver and the region of the spleen, in order to prevent the formation of a subphrenic abscess, a complication which marred the success of a case of my own and of two other cases on my list. The abdomen having been well flushed out, a rubber drainage tube is inserted in the upper incision, and a gauze drain is placed over the site of perforation, the rest of the wound being closed in the ordinary way; finally, a glass drainage tube should be inserted into the Douglas pouch through the counter opening above the pubes. If with strong signs of perforation no extravasation is found in the general peritoneal cavity, but there is some injection of the peritoneum, we should suspect the rupture of an ulcer on the posterior surface of the stomach; to reach this, after shutting off the general cavity with sponges, the gastric-colic omentum must be torn through, which will open up the lesser cavity of the peritoneum. If there are no signs of extravasation in the lesser cavity, we may assume that no perforation has taken place, or that sufficiently firm adhesions have already formed. If extravasation be present, we must search for the ulcer, which when found should be sutured after invagination; the lesser cavity must then be carefully irrigated, especial care being taken to clean thoroughly the portion above and behind the liver. The general peritoneal cavity will probably not be soiled, and so will not require irrigation. The wound will then be closed, with the exception of a drainage tube in the lesser cavity.

In either case the operation, of course, must be performed as rapidly as possible, so as to minimize the shock. After the operation the patient should be fed by nutrient enemata and suppositories for the first three or four days, and then feeding by the mouth may be cautiously commenced with preparations which are already partially digested and which leave little residue. The gauze drain and the suprapubic tube should be removed at the end of three days, but the rubber tube should be left in for a few days longer.

When adhesions have formed previous to perforation we may have a communication established with the colon, the pericardium, or with the small intestine, or a localized abscess which will probably be in one of two positions, but in any case is termed subphrenic. In perforation of the anterior surface of the stomach the abscess first forms between the stomach and the under surface of the liver, and then, when prevented from getting into the general peritoneal cavity by reason of adhesions, passes up between the liver and the diaphragm, and forms a tumor just below the costal arch. In perforation of the posterior surface of the stomach the abscess first forms between the stomach and the anterior surfaces of the pancreas and the duodenum; it then passes upward between the posterior surface of the liver and the diaphragm, and if it comes to the surface it will do so between the stomach and the transverse colon; it may, however, perforate into the thorax, forming a pneumopyothorax. If either of these varieties form a swelling in the abdomen they had best be opened in the middle line as high up as possible; in the anterior variety the abscess will be opened at once; in the posterior variety it will be necessary to tear through the gastro-colic omentum in order to reach the abscess. In either case a drainage tube should be inserted, and though some flushing of the cavity is advisable, this must be done with extreme care, so as to avoid breaking down adhesions. In cases in which no abdominal swelling exists, but there is dulness over the left lower costal region, the abcess can best be reached by resection of the eighth and ninth ribs in the axillary line; the pleura, of course, is opened, but the diaphragmatic is sutured to the costal pleura before the diaphragm is divided. The abscess is then drained through this incision.

Before passing on to the statistics of these operations, I would point out to you the risk of mistaking a severe attack of colic, accompanied by collapse and associated with a history of gastric ulcer, with a perforation of the stomach. I have performed an abdominal section in such a case, and on two occasions recently I have been urged to operate in such cases, all of which subsequently recovered without a bad symptom. I would also refer to two cases recorded by Bennett and Tuffier, in which an operation was performed on account of symptoms of perforation, an ulcer on the anterior wall being found in each case, but perforation had not taken place. In the first case the ulcer was excised, and in the second a gastro-enterostomy was performed, both being successful.

The main factors in making a diagnosis in these cases will be the absence of any interference with the liver dulness, the absence of board-like rigidity of the abdominal walls, the absence of signs of fluids, and the smaller amount of shock. However, in real doubt it is better to open the abdomen than to run the risk of leaving a perforated ulcer till too late for a successful result, since the exploratory incision is practically devoid of risk. In these cases a surgeon should not be considered as a mere carpenter, to be called in only to operate, but he should see the case at as early a period as possible, in order to aid in settling the question whether perforation has taken place. I regret to say that in two cases recently, on account of the time taken in making a diagnosis of perforation and deciding to call in surgical aid, the patients both died before I could do an operation.

With regard to subphrenic abscess, I will mention a very interesting case, in which an empyema originated from this cause. A man, aged thirty-five years, who had previouly suffered from flatulence and slight gastric pain, but who had had no definite symptoms of gastric ulcer, suddenly developed chest symptoms, and coughed up a quantitiy of pus. This continued, and the temperature became hectic; he was admitted to the West London Hospital under Dr. Ball, who diagnosed an empyema, which had burst into the bronchus, and asked me to explore for it. I accordingly resected a portion of the ninth rib in the axillary line, and evacuated some very fetid pus. A week or so after the operation the patient ate some figs, and some of the seeds were found in the dressings. In order to test whether a communication existed between the stomach and the abscess cavity, some methyl-blue was given by the mouth, with the result that the pus from the wound was tinged with blue. We therefore came to the conclusion that there was a communication between the stomach and the abscess, and consequently the case was one of ruptured gastric ulcer, in which a subphrenic abscess had formed, and had burst into the pleura. The patient did well. A similar case has been recorded by Mackenzie, which was successfully treated in the same manner.

STATISTICS OF OPERATIONS FOR PERFORATED ULCER. I have collected and tabulated the cases of operation for gastric ulcer which had perforated into the general peritoneal cavity and have been recorded during the last two years. They amount to 55 cases, of which 33 were cured, a mortality of 40 per cent. This percentage is low compared with other tables, but all these cases have been done within the last three years, and, moreover, they cannot be regarded as an absolute guide to the chances of recovery, since surgeons are much more prone to record successful than fatal cases. If we examine the tables of other authors we find the mortality much greater; thus Mickulicz records a series of 103 cases with 33 recoveries, or a mortality of 67.9 per cent.; Parisier records 99 cases with 33 recoveries, a mortality of 66.6 per cent., and Comte mentions 65 cases with 19 recoveries, or a mortality of 70.76 per cent. If all these series be added together, we shall, of course, be certain to record some cases several times over, but the result ought to give a good idea of the mortality; we should then have 494 operations with 172 recoveries, or a mortality of 65.2 per cent. Now these series contain cases which were operated on many years ago, and those of Mickulicz clearly show the improvement which has taken place in recent years, for out of his 103 cases 35 cases were operated on before 1894, with only one recovery, or a mortality of 97.15 per cent., while 68 cases have been operated since that date, with 32 recoveries, or a mortality of 52.94 per cent. Now if my series of cases, which are all recent, be added to the recent ones of Mickulicz, we should have a mortality of 47.15 per cent.

With regard to the success of operations for subphrenic abscess, I find records of 3 cases of primary operation for this condition during the last two years; 2 of these recovered; there were also 3 other cases in which a subphrenic abscess formed after an operation for perforated ulcer, all of which died. Comte gives 23 cases with 11 cures, Barling 6 cases with 2 cures, making a total of 32 cases with 15 cures, or a mortality of 53.1 per cent. We may therefore consider that the chances of success are no better, if as good, as in operations for perforation into the general peritoneal cavity.

The next indication for operation is hemorrhage. Some interference may be called for (1) in cases of repeated severe hemorrhage which threaten life, and (2) when there are frequent small hemorrhages, as shown by the occurrence of coffee-ground vomit and tarry stools; in such conditions an operation is to be recommended when there is marked anæmia produced, and especially when there are signs of dilatation of the stomach. Although hemorrhage occurs in from 30 to 45 per cent. of all cases of gastric ulcer, only a small proportion of cases require operation When the hemorrhage is only slight and infrequent, or when, though severe, it is not repeated, the case will be better left to medical treatment; on the other hand, I would warn you not to allow a patient to become too debilitated and anæmic before calling in surgical assistance.

There is a large choice of operations in this condition; among these may be mentioned (1) resection of the ulcer, (2) the application of a purse-string suture around the ulcer without excision, (3) gastro-enterostomy, and when the ulcer involves the pylorus, (4) pyloroplasty, and (5) pylorectomy.

The first mentioned operation—namely, resection of the ulcer—is now seldom attempted on account of its high mortality; thus Mickulicz reported 4 cases with 3 deaths. The second method is much to be preferred, and has been followed by greater success; the third method, gastro-enterostomy, aims at giving complete rest to the ulcer by relieving the pyloric spasm, and so putting an end to any dilatation of the stomach, with consequent stretching of the base of the ulcer; the fourth and fifth methods have been successfully employed when the ulcer has involved the pylorus, but they appear to be rather too severe operations even in these cases.

In cases of hemorrhage I would recommend that after performing laparotomy the stomach should be opened and emptied of its contents. If an ulcer can be seen, and its base is not contracted by adhesions to neighboring parts, it should be surrounded by a purse-string suture, so as to constrict its base. If the ulcer be adherent it should not be sutured, but a gastro-enterostomy should be performed; if no ulcer is seen the stomach should be inverted like the finger of a glove, and a search made for a superficial abrasion; this, when found, should be surrounded by a purse-string suture. It is noteworthy that in 7 cases of hemorrhage so severe as to threaten life only a superficial ulceration was present, and the failure to recognize this at the operation was responsible for a recurrence of the hemorrhage, and a fatal issue in at least 2 cases; moreover, in 2 cases of sudden death from hæmatemesis only a superficial ulceration was found at the autopsy.

As a last stage of the operation, it will be advisable to perform gastro-enterostomy in any case in which there is the slightest tendency to dilatation, in order to insure rest to the ulcer. No abdominal drainage will be needed, but the after-treatment will be carried out in much the same way as after an operation for perforation.

STATISTICS. These are not very satisfactory. I have collected 21 cases of operation for hemorrhage with 8 recoveries and 13 deaths, or a mortality of 61.9 per cent.; of these 6 were cases of excision of the ulcer and suture with 3 deaths, 12 were gastro-enterostomies with 8 deaths, 2 were cases of applicaton of a purse-string suture with 1 death, and 1 case each of pylorectomy (fatal), ligature of the coronary artery, and cauterization of the ulcer (both successful). Hartman records 12 cases with 8 deaths, or a mortality of 66.6 per cent. It is needless to say that up to the present this operation has only been performed on patients who were practically moribund, and so the high death-rate is not surprising.

We have now to discuss the question of operation for those cases of gastric ulcer which resist ordinary medical treatment, and for those in which there is dilatation of the stomach in consequence of cicatricial contraction of the pylorus. These may well be considered together since in most cases which resist medical treatment some dilatation of the stomach will be found to have taken place. According to the statistics of Von Leube an operation will be required in only a few cases, for out of 1000 cases of gastric ulcer which he had treated 750 were cured by medical treatment, 210 improved, 16 derived no benefit, and 24 died.

According to these statistics an operation would be required in only about 4 per cent. of all cases, but might be permissible in a further 21 per cent. under certain circumstances. Thus in a case of old-standing ulcer, in which the patient is unable or unwilling to follow the necessary diet, an operation may be offered to the patient; secondly, in cases of severe pain, progressive emaciation, and vomiting, or where the patient does not appear to get any better, an operation will be indicated; lastly, in cases of dilatation of the stomach, either from actual ulceration or cicatricial contraction, especially if a tumor be felt in the pyloric region, some operation is demanded. I should here mention that many cases of gastric ulcer in the neighborhood of the pylorus, accompanied by inflammatory thickening and causing dilatation, have been diagnosed and treated as cases of new growth; this is especially apt to occur when the glands in the hilus of the liver are affected, although these glands are often affected in consequence of gastric ulcer. I have made this mistake in two cases, in one of which there was a large swelling at the pylorus, with enlarged glands in the hilus of the liver; as I thought the growth too extensive for removal, I performed a gastro-enterostomy; at the end of one year the tumor had disappeared and was replaced by a cicatricial tissue; in the other the pylorus was occupied by a fibrous ring, the result of old ulceration; this case was cured by Loretta's operation.

The occurrence of dilatation of the stomach in cases of ulcer at the pylorus is generally admitted; but it is further urged by Olivier that pyloric spasm often exists in cases of ulcer in other parts of the stomach and is due to the hyperacidity of the gastric contents so frequently met with in these cases. The fact that dilatation of the stomach undoubtedly impedes the healing of a gastric ulcer, and that its treatment by the passage of a stomach tube and lavage is contraindicated in ulceration, is used as the chief argument in favor of the performance of gastro-enterostomy in cases where dilatation is present.

The operations which may be performed in these cases are (1) gastro-enterostomy, (2) pyloroplasty, (3) pylorectomy, and (4) Loretta's operation. The last named is not very satisfactory, and the third is too severe for an ordinary case, but may be required in cases where pyloroplasty has been attempted, but the parts have been found too friable to hold the sutures. The choice of operation will therefore lie between gastro-enterostomy and pyloroplasty, and opinions are fairly evenly balanced in favor of each.

In either operation the abdomen is opened either in the middle line or by a transverse incision parallel to the costal arch. If gastro-enterostomy is to be performed, it is desirable to attach the jejunum to the posterior surface of the stomach. The posterior surface of the stomach is exposed either by tearing a hole in the gastro-cœlic omentum or by turning up the colon and great omentum. The first part of the jejunum is then sought for, and is applied to the posterior surface of the stomach, being united preferably by sutures, all of which should be passed before either gut is opened. Care should be taken to make a sufficiently large opening between the two visceræ, on account of subsequent contraction of the stomach. The parts are then replaced and the abdominal wound closed. The methods of performing the anastomosis, which should always be a lateral one, are very numerous, and include the use of various apparatus, such as Mayo-Robson's and Allingham's bone bobbins, Senn's plates, Paul's ring, etc. Personally, I prefer and have always practised simple suture with mattress sutures.

If pyloroplasty is to be performed a horizontal incision is made over and into the pyloric orifice, and this incision is sutured in a vertical direction, producing a large pyloric opening. Bone bobbins, etc., may be used to assist the suture. The after-treatment of these operations differs little from that of other operations on the stomach, except that in uncomplicated cases feeding by the mouth may be commenced after forty-eight hours.

STATISTICS. The success of these operations has undergone a great improvement during the last few years; thus, while Cutler and Elliott and Grieg Smith estimate the mortality of gastro-enterostomy at 30 per cent., Mickulicz estimates it at 16 per cent., with a series of 68 recent cases. If we examine the cases recorded during the last two years, including a series of 21 successful cases by Doyen, we shall have 63 cases with 4 deaths, or a mortality of 6.4 per cent. If Mickulicz's collection is added to mine we have 131 cases with 15 deaths, or a mortality of 11.5 per cent.

With regard to pyloroplasty, which is a more modern operation, the results are slightly inferior. I have collected 109 cases with 17 deaths, or a mortality of 15.5 per cent. Mickulicz records 76 cases with a mortality of 13 per cent., while Cutler and Elliott estimate it at 12 per cent. If we add Mickulicz's cases to my collection we have 185 cases with 27 deaths, or a mortality of 14.5 per cent. I have not many statistics for the other operations, but Cutler and Elliott estimate the mortality after pylorectomy at 35 per cent., and that after Loretta's operation at 15 per cent. If we now add all the cases of all these operations we have 242 operations for gastric ulcer and its complications, other than perforation and hemorrhage, with 32 deaths, or a mortality of 12.4 per cent.

The last condition in which an operation may be required is when adhesions have formed, after the cicatrization of a gastric ulcer, between the stomach and neighboring organs, such as the liver, the spleen, the transverse colon, the omentum, the small intestine, or the anterior abdominal wall. If the adhesions are in the region of the pylorus they will probably cause a kink, and so produce dilatation of the stomach; when in other parts of the stomach they may produce persistent vomiting or only severe pain. In my experience this pain from adhesions is worse in the early morning before food has been taken. The following illustrates the class of cases where pain is the only symptom: A woman, aged forty years, had been under treatment in hospital for eight weeks for gastric ulcer accompanied by severe hæmatemesis. Although there had been no further bleeding since admission, she suffered from severe attacks of abdominal pain, which were more marked in the early morning. As these attacks of pain became more frequent and more severe, although the patient was kept in bed and on a limited diet, an exploratory operation was performed, and adhesions between the stomach and omentum were found.

The treatment consists in opening the abdomen in the middle line and examining the surface of the stomach; if adhesions exist between the omentum and the stomach, the omentum should be divided between two ligatures, as was done in my case; if adhesions exist with other organs, they had better be carefully separated with the finger, and if the surface of the stomach then shows a thin cicatrix, it will be best to invaginate and suture the scar, so as to avoid the risk of a subsequent perforation.

I am afraid that I cannot give you any statistics of this operation, but the mortality should be practically *nil*, since no important parts are interfered with. I have performed two such operations myself, and two others have been recorded by Mayo-Robson and Clive-Low, all of which were successful.

I think that this concludes the list of operations which may be required in the treatment of gastric ulcer. Mickulicz states that the mortality of operations in gastric ulcer does not exceed 10 per cent., and if all my statistics are massed together, with the exception of those which are known to have been operated on before 1894, we have a series of 422 operations for gastric ulcer and its complications, with 71 deaths, or a mortality of 16.5 per cent. When we compare these results with those of treatment without operation—namely, Von Leube's series of 1000 cases with 75 per cent. of recoveries—we ought only to compare them with the results in the 250 cases which were not cured.

Out of these 250 cases, 24, or 9.6 per cent. died, and a further 16, or 6.4 per cent., derived no benefit, making a total of 16 per cent. which either died or resisted treatment; the mortality of my collection of cases —namely, 16.5 per cent.—does not compare unfavorably with these results, especially when we remember that a considerable number of my cases were almost moribund when the operation was performed. I feel confident that when surgical interference is practised earlier we shall have very much better results, and I believe that with a better knowledge of what surgery can do in these cases, practitioners will be only too glad to avail themselves of its assistance at an early period of the case. To show how little the urgent necessity for early operation, even in cases of perforation, is recognized, I would refer you to a report of eight autopsies on cases of perforated ulcer recorded by Sutherland, in only one of which was an operation performed, and this too late to have much chance of being successful. Had these cases been operated on about one-half would probably have recovered.

In conclusion, I would briefly recapitulate the class of cases of gastric ulcer in which an operation should be done:

1. In all cases of perforation at the very earliest possible moment; also in subphrenic abscess.

2. In cases of hemorrhage (*a*) when there is continual oozing of blood, especially if the stomach be dilated, and (*b*) in cases of repeated severe hemorrhage.

3. In cases where there is severe pain and vomiting unaffected by treatment, and which is producing progressive emaciation.

4. In cases of dilatation of the stomach from contraction within or from adhesions outside the stomach.

The operations to be performed are: In class 1, laparotomy and suture of the ulcer; in class 2, gastrotomy and suture of the ulcer, with a purse-string suture, combined with gastro-enterostomy; in class 3, gastro-enterostomy, in order to give physiological rest to the ulcer; and in class 4, either gastro-enterostomy, or, if the pylorus be affected, pyloroplasty or pylorectomy.

As the surgery of gastric ulcer is a comparatively new subject, I have had, so to speak, to make a case in its favor. It has been my endeavor to show that no patient ought to be allowed to die either from perforation, or from hemorrhage from a gastric ulcer, without a surgical effort being made to save him; that the earlier such effort is made the better the chance of success, and, finally, that surgery offers much hope of success in other cases which resist the art of the physician.

General Statistics.

Collected by	Nature of operation.	Cause.	No. of cases.	Cured.	Died.	Percentage of mortality.
Bidwell,	For perforated gastric ulcer.	General peritonitis perforation.	55	33	22	
Comte,	" " "	" " "	65	19	46	
Barling,	" " "	" " "	31	11	20	
Le Dentu,	" " "	" " "	25	5	20	
Chaput and Mauclair,	" " "	" " "	45	15	30	
Houzé,	" " "	" " "	67	20	47	
Mickulicz,	" " "	" " "	103	33	70[1]	
Schwartz,	" " "	" " "	23	3	20	
	Total		414	139	275	66.42 per ct.
Comte,	Incision and drainage of abscess.	Subphrenic abscess.	23	11	12	
Barling,	" "	" "	6	2	4	
Bidwell,	" "	" "	4	3	1	
	Total		33	16	17	51.51 per ct.
Marion,	Operations for hemorrhage.	Severe or repeated hemorrhage.	9	3	6	
Bidwell,	" "	" " "	12	6	6	
	Total		21	9	12	57.14 per ct.
Carle and Fantino,	Gastro-enterostomy.	Dilatation or pain.	24	22	2	
Doyen,	" "	" "	21	21	...	
Doyen,	" "	" "	12	11	1	
Mickulicz,	" "	" "	68	57	11	16 per ct.
Bidwell,	" "	" "	5	4	1	
	Total		130	115	15	11.53 per ct.
Carle and Fantino,	Pyloroplasty.	Dilatation or pain.	14	13	1	
Mikulicz,[1]	"	" "	76	66	10	13 per ct.
Corraza,	"	" "	53	47	6	
Comte,	"	" "	38	29	9	
Bidwell,	"	" "	4	3	1	
	Total		185	158	27	14.7 per ct.
	Grand total		783	437	346	44.18 per ct.

---

[1] Before 1894, 35 cases, 1 cured. After 1894, 60 cases, 32 cured.

EPITHELIOMA AS A SEQUEL OF PSORIASIS AND THE PROBABILITY OF ITS ARSENICAL ORIGIN.[1]

BY M. B. HARTZELL, M.D.,
INSTRUCTOR IN DERMATOLOGY, UNIVERSITY OF PENNSYLVANIA; DERMATOLOGIST TO THE METHODIST EPISCOPAL HOSPITAL, PHILADELPHIA.

IN November, 1898, Miss M., aged thirty-five years, came under my professional care through the kindness of Dr. H. W. Stelwagon, whose patient she had been for many years, but who no longer found it convenient to look after her. At that time she presented the following lesions: On the outer side of the heel of the left foot was an ulcer about two inches in diameter, shallow at the edges but quite deep in the centre, with a perfectly flat, uninfiltrated border. Close by this large ulcer, which was very painful, was a much smaller, very superficial one, which was evidently undergoing cicatrization. In addition to these ulcerative lesions the soles of both feet were the seat of a marked keratosis, which existed as diffuse patches upon the heels, and shot- to pea-sized, clavus-like elevations, most numerous beneath the metatarso-phalangeal articulations. The palms of both hands were also the seat of a keratosis even more marked than the soles, the palmar surface of the fingers presenting numerous shot-sized, corneous elevations, while the centre of the palms was dry and thickened. Besides these keratosic lesions there were several small, superficial ulcers upon the palmar surface of the fingers, which had originated at the site of corns and were quite painful. Upon the elbows and trunk were a few patches of psoriasis, which presented nothing unusual. Upon the left breast was an irregularly oval, quarter-dollar-sized, red, somewhat thickened, slightly crusted patch, which was just beginning to ulcerate in small areas. In the left groin was a bosselated tumor the size of a small orange, firm and elastic, except upon the summit, where the skin was evidently upon the point of giving way. The history of the case, as obtained from Dr. Stelwagon and the statements of the patient herself, was as follows: At fourteen years of age she began to have psoriasis of the ordinary type, from which she had never been entirely free since, and for which she had taken arsenic in considerable doses over long periods of time. Some nine or ten years after the first appearance of the psoriasis horny patches and corn-like elevations began to appear in the palms of the hands and on the soles of the feet, and at a still later period—how soon after the keratosis I was not able to learn accurately—small, superficial ulcers occurred beneath these horny masses, which

---

[1] Read at the twenty-third annual meeting of the American Dermatological Association, May 30, 1899.

PEDIATRICS.

PAGE
New Treatment of Whooping-cough . 353
Pott's Disease in the Nursling . . 354
Tannalbin in Acute Follicular Enteritis 355
Paralysis in Whooping-cough . . 355
Etiology of Night Terrors . . . 355
PAGE
Digitalis in Pediatric Practice . . 355
Three Steps in the Tuberculous Process in Children 356
Comparative Value of Recent Antiseptics in Pediatric Practice . . 356

THERAPEUTICS.

Antistreptococcic Serum in Smallpox 357
Malta Fever Treated with Malta Fever Antitoxin 357
Tetanus Antitoxin 358
Value of Marmorek's Serum . . 358
Arsenic in Treatment of Accidents of Thyroid Extract Administration . 359
Gelsemium Sempervirens . . . 359
Treatment of Diphtheritic Paralysis 360
The Treatment of Some Climacteric Neuroses 360
Treatment of Headaches . . . 360
Gold in Anæmia and Malnutrition . 361
Aspidium Spinulosum . . . 361

OBSTETRICS.

Weight of Fœtus and of Placenta in Cases of Materna Albuminuria . 362
Phloridzin-Diabetes in Mother and Child 362
Slowing of the Pulse during the Puerperal State 363
Unusual Forms of Puerperal Hemorrhage 363
Three Cases of Labor in Double Uterus 364
Hemorrhages in the Early Months of Pregnancy 365
The Placenta in Triple Pregnancy . 365

GYNECOLOGY.

Vaginal Hysterectomy with Doyen's Clamp 366
Resection of Diseased Ovaries . . 366
Enucleation of Uterine Fibroid . 366
Tumors Developing from Gärtner's Ducts 367
Restoration of the Urethra by Gersung's Method 367
Malignant Adenoma of the Uterus . 367
Primary Cancer of the Uterus . . 368
Appendicitis and Salpingitis . . 368
Hernia of the Fallopian Tubes . . 368
Fibroma of the Ovary . . . 368
Peritoneal Resorption . . . 368
Cancer of the Cervix Uteri following Supravaginal Amputation . . 369

DERMATOLOGY.

Treatment of Lupus Erythematosus . 369
Eczema Treated by Röntgen Rays . 370
The Treatment of Scleroderma by Thiosinamin 370
Liomyoma Cutis 370
Acute Circumscribed Œdema Associated with Hæmoglobinuria . . 371
Lichen Annularis 271

PATHOLOGY AND BACTERIOLOGY.

Study of the Spinal Cord by Nissl's Method in Typhoid Fever . . 372
Bacteriology of the Accessory Sinus of Nose in Diphtheria and Scarlet Fever 373

HYGIENE AND PUBLIC HEALTH.

Poisoning by Meats 374